

## Differentiation - Product Rule

**Differentiate each function with respect to  $x$ .**

1)  $y = -x^3(3x^4 - 2)$

2)  $f(x) = x^2(-3x^2 - 2)$

3)  $y = (-2x^4 - 3)(-2x^2 + 1)$

4)  $f(x) = (2x^4 - 3)(x^2 + 1)$

5)  $f(x) = (5x^5 + 5)(-2x^5 - 3)$

6)  $f(x) = (-3 + x^{-3})(-4x^3 + 3)$

7)  $y = (-2x^4 + 5x^2 + 4)(-3x^2 + 2)$

8)  $y = (x^4 + 3)(-4x^5 + 5x^4 + 5)$

$$9) y = (5x^4 - 3x^2 - 1)(-5x^2 + 3)$$

$$10) f(x) = (-10x^2 - 7\sqrt[5]{x^2} + 9)(2x^3 + 4)$$

$$11) y = (5 + 3x^{-2})(4x^5 + 6x^3 + 10)$$

$$12) y = (-6x^4 + 2 + 6x^{-4})(6x^4 + 7)$$

$$13) f(x) = \left(-7x^4 + 10x^{\frac{2}{5}} + 8\right)(x^2 + 10)$$

**Critical thinking question:**

- 14) A classmate claims that  $(f \cdot g)' = f' \cdot g'$  for any functions  $f$  and  $g$ . Show an example that proves your classmate wrong.